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Engineering Drawing Transfer Test with the Air Force Ogden Air Logistics Center: MIL-D-28000 Class II (IGES)

Quick Short Test Report

February 16, 1990

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1 Test Parameters

Test Plan: CTN89-ED-22

Date of Evaluation: October 6, 1989

Evaluator:
Lawrence Livermore National Laboratory
P.O. Box 808, L-542
Livermore, CA 94550

Data Originator:
Air Force Ogden Air Logistics Center
OO-ALC/MMDED
Hill Air Force Base, Utah 84056-5609

Data Description:
2 document declaration files
2 header files (misinterpretation of MIL-STD-1840A)
1 IGES engineering drawing file
1 IGES 3D model file

Data Source System:

Text	Hardware:	Apollo Network Server Processor DSP 90
	Software:	Standard Apollo editor
IGES	Hardware:	Apollo Network Server Processor DSP 90
	CAD Software:	Auto-trol Series 7000 Advanced Graphic, Release 12.1
	IGES Software:	Auto-trol Series 7000, Release 7.1

Evaluation Tools Used:

1840A	CTN TAPEVAL (0.9) VAX/VMS
IGES	IGES Data Analysis, Inc. Parser/Verify Rosetta Technologies, Inc. PreVIEW

Standards Tested:
MIL-STD-1840A Notice 1(1840A)
MIL-D-28000 Amendment 1 (28000) Class II

2 1840A Analysis

This test turned up some typical misinterpretations of MIL-STD-1840A that need to be documented. The misunderstandings are not a reflection of the data creator, but of 1840A's ability to be unambiguous as a stand alone document.

2.1 External Packaging

There was no 1840A packaging or external labeling on the Ogden Air Logistics Center's (OO-ALC) tape.

2.2 Transmission Envelope

The tape's declaration files were non-machine readable, therefore the analysis of the 1840A transmission envelope was conducted by hand.

2.2.1 Tape Formats

The tape was not labeled with a six-character label, however, to the best of the hand analysis, the record formats and record sizes were correct. The block sizes could not be determined.

2.2.2 Declaration Files and Header Fields

Two major problems existed: 1) each data file had, in addition to a declaration file, a header file rather than having the header records imbedded into each data file, and 2) neither the declaration files nor header files were machine readable. Non-machine readable means that the text was not left justified, (did not begin in the first record of the file) and contained multiple spaces (not just one space) between the record identifiers and record descriptions. These problems highlight two major ambiguities in 1840A. The recommended solutions are to modify 1840A to clearly state that: 1) the header records should be imbedded in the data files, and 2) the declaration files and header fields should be machine readable.

3 IGES Analysis

The 3D model graphics and the engineering drawing graphics (3D graphics represented on a drawing sheet) transferred perfectly, however, the IGES files themselves did not conform to 28000 Class II, the Engineering Drawing Subset. The areas of non-conformance were: 1) both files contained several unspecified Global Section parameters that 28000 does not allow to be defaulted, 2) neither file contained the proper Start Section information as required by 28000, and 3) neither file contained the CALS required Drawing and Drawing Property Entities. The first problem is attributed to the CAD system, however, the last two problems were the responsibility of and could have been corrected by the person both creating the drawing and pre-processing the IGES file.

In the first instance, the inappropriately defaulted Global Section parameters, OO-ALC used the Auto-trol Series 7000 Revision 7.1 CAD system which did not provide OO-ALC with the ability to enter these required parameters. Auto-trol currently has newer versions (Revision 8.0 or higher) of its IGES translator on the market which provide a 28000 Class II pre-processing switch that not only allows the user to enter this required information, but also prompts for it. These latest revisions of Auto-trol's pre-processor will also correct problem two, the missing Start Section information, by again prompting the user for the data. OO-ALC, however, should have entered this information manually for this test. Finally, OO-ALC could have corrected problem three by creating a CAD system drawing for each part, thereby creating an IGES Drawing Entity in each IGES file.

4 Conclusions and Recommendations

In summary, the Ogden Air Logistics Center's tape contained good IGES files that represented the desired graphics, but the data itself and the declaration files did not meet the CALS requirements. This tape did not meet the 1840A requirements due to the creator's misinterpretations of the standard, therefore this test highlights needed changes to 1840A to correct these ambiguities.

The specific results are that the 1840A header information was correct, yet not machine readable, and that the external packaging was in non-conformance with the standard. Furthermore, the tape contained not just declaration files, but also header files, due to OO-ALC's misinterpretation of 1840A. These results lead to the recommendations that 1840A be modified to state:

1. For each data file type except raster, the header should make up the first records of the file, with the data immediately following. For raster files, the first block of the file should contain the header and then padding to fill the block.

2. The declaration files and header records should be left justified and begin in the first record of the file.

3. The record identifiers and the record descriptions should be separated by a colon and a single space character. (This requirement is already stated in standard, but it needs to be restated more strongly.)

Furthermore, OO-ALC's IGES files were in non-conformance to 28000 Class II, yet contained perfect graphics. OO-ALC can correct much of this non-conformance by creating a CAD system drawing for each part and by using the most recent version of the Auto-trol pre-processor with the 28000 Class II switch that prompts the user for the required Start and Global Section information.

Lastly, OO-ALC forwards the following comment and recommendation regarding 1840A: "1840A requires that the declaration files and data files be written to the tape with different recording factors. This is confusing and takes manual intervention to set up each file on the tape. All files should utilize the same ANSI type, record length, and block length." The CTN agrees that these recording factors make writing 1840A tapes difficult and recommends that more uniform recording formats be implemented in 1840A where ever possible.